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Curriculum Subcommittee Agenda, October 2, 2014

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CURRICULUM SUBCOMMITTEE AGENDA
2 October 2014

A meeting of the Curriculum Subcommittee of the Educational Policies Committee will be held on 2 October 2014 at 2 p.m. in Old Main 136 (Champ Hall Conference Room).

Approval of the minutes of the 4 September 2014 meeting (see below)

College of Agriculture and Applied Sciences

Applied Economics

Course	Cr.	Title	Type	Details	Offered	Effective
APEC 5700/ 6700	3	Regional and Community Economic Development	Course Description Change	Building on microeconomic theory, models for regional and urban structure and change are explored. Policy decision models based on advances in economic growth and development, economic structure, land-use, public finance, housing, social welfare, and transportation are developed.	Sp	Spring 2016
			Prerequisite Change	Prerequisite: APEC 4010/ECN 4010		
			Dual List	APEC 5850 and APEC 6700 are currently taught as separate courses with the same title. There is considerable overlap in the course content and both are very low enrollment courses. By combining the courses into one dual listed course, students should have an improved course experience and APEC will make more efficient use of departmental resources. Student signing up for the 6700 credit will be required to do an extensive term paper as part of the course requirements.		
APEC 5950	3	Applied Economics Policy Analysis	Title Change	The former course title "Senior Project" and the former course description are not very descriptive of the actual course. The new proposed title and expanded description provide greater detail for this course.	F	Fall 2015

			Course Description Change	This course focuses on the identification and analysis of current agricultural, natural resources and environmental economic policy issues. Throughout this process, other applied economics course concepts and methods are brought together to understand and analyze the policy issues.		

Nutrition, Dietetics and Food Sciences

Course	Cr.	Title	Type	Details	Offered	Effective
NDFS 1030	1	Introduction to Dietetics	New Course	Overview of Registered Dietitian Nutritionist education pathways and requirements including: educational requirements and options for completion; requirements for acceptance to the Dietetics Programs at USU; requirements including: educational requirements and options for completion; requirements for acceptance to the Dietetics Programs at USU; requirements for Registration by the Commission on Dietetic Registration (CDR). No prerequisites.	F	Fall 2015
NDFS 4490	2	Community Nutrition Experience 1	New Course	Practical experience in community nutrition. Integration and application of material learned in NDFS 4480. Corequisite: NDFS 4480.	F	Fall 2015
NDFS 5170/ 6170	1-3	Food Safety & Quality	Credit Hour Change	The workshops that make up this course can be taken separately depending upon which semester they're available.	Su	Summer 2015
NDFS 5230	3	Communicating Current Topics in Nutrition	Add University Studies Designation	Add (CI) designation. Expected Max Students per section: 30. Major requirement for NS & DD. Course is cross listed with NDFS 6230. **Approved at 9/16/14 Gen Ed**	Sp	Spring 2015

Plant Soils and Climate

Course	Cr.	Title	Type	Details	Offered	Effective
PSC 3800	3	Fundamentals of Organic Agriculture	Prerequisite Change	Add "PSC 3000 Fundamentals of Soil Science" as a new	Sp	Summer 2015

				prerequisite.		
			Course No. Change	Change the course number from 2800 to 3800		

Caine College of the Arts

Course	Cr.	Title	Type	Details	Offered	Effective
MUSC	3	Rock & Roll: Catalyst for Social Change	Add University Studies Designation	Add (DHA) designation. Max enrollment per term: 150. Not a major requirement. **Approved at 9/16/14 Gen Ed**	F, Sp	Fall 2014

Jon M. Huntsman School of Business

Accounting

Course	Cr.	Title	Type	Details	Offered	Effective
ACCT 4300	3	Accounting Internship	Course Description Change	Provides accounting internship experience in a career-related position approved by the School of Accountancy. Prerequisite: Admittance to a USU major; cumulative GPA of 2.67 or higher; and completion of at least 40 credits. Instructor approval required.	F, Sp, Su	Spring 2015
ACCT 6300	3	Advanced Accounting Internship	Course Description Change	Provides accounting internship experience in a career-related position approved by the School of Accountancy. Restriction: Instructor approval required.	F, Sp, Su	Spring 2015

Emma Eccles Jones College of Education and Human Services

COMMDDE

Course	Cr.	Title	Type	Details	Offered	Effective
COMD 7710	3	Evidence-Based Practice in Audiology	New Course	Discussion of evidence-based practice in hearing and balance disorders, including existing research base, areas in need of further research, and issues related to implementation in practice.	F, Sp, Su	Spring 2015

COMD 7730	3	Advanced Topics in Audiology	New Course	Discussion of advanced topics and issues in hearing and balance disorders, including assessment and treatment considerations, underlying influences related to treatment adherence, and functional outcomes.	F, Sp, Su	Spring 2015
COMD 7740	3	Research in Audiology	New Course	Under faculty direction, students read and discuss current research in audiology, examine methods used, and limitations.	F, Sp, Su	Spring 2015
COMD 7880	2	Research Methods in Audiology	New Course	Discussion of common research methods used in audiological research and design considerations	F, Sp, Su	Spring 2015
COMD 7890	1	Journal Reading–Audiology	New Course	Under faculty direction, students read and discuss published research. Students learn to critique empirical and theoretical papers as well as current research findings in important areas of Audiology.	F, Sp, Su	Spring 2015

HPER

Course	Cr.	Title	Type	Details	Offered	Effective
HEP 3800	3	Health Care Systems	New Course	The course reviews the history of how the U.S. health care system was developed and explores the complexities of various delivery systems including: providers, accessibility, quality of care, healthcare financing, insurance carriers, etc.	F	Fall 2015
HEP 4000	3	Health Services Administration	New Course	This course explores the management, general environment, types and structures of health services organizations and systems. The course also reviews the manager's role in ethical and legal concerns, problem solving, the "quality" environment, and marketing and allocating resources.	Sp	Spring 2015

HEP 4800	3	Human Diseases	New Course	The course explores the body systems and common diseases that afflict them. Risk factors are identified with a focus on risk reduction and the implementation of health promotion strategies in order to prevent or intervene in the disease process.	F, Sp	Spring 2015
HEP 5200	3	Foundations of Global Health	Course Description Change/Title Change	The purpose of this course is to provide an introduction to health promotion practice and public health from a global perspective.		Spring 2015
PE 1080	1	Crossfit	New Course	Crossfit workouts incorporate elements from high-intensity interval training, Olympic Lifting, plyometrics, powerlifting, gymnastics, kettlebell lifting, calisthenics, and other exercises. Repeatable, P/F	F, Sp, Su	Spring 2015
PEP 6860	2	Motor Development	New Course	A study of the progressive change in movement behavior from infancy through older adulthood. Emphasis upon developing the ability to identify the stages in a variety of motor skills, physical growth patterns and biological maturity and the relationship of each to motor performance.	Sp (alternate years)	Spring 2015
PEP 7870	2	Advanced Motor Behavior Seminar	New Course	This course provides students with advanced study and understanding of principles underlying general motor control. Emphasis will be placed on the theoretical bases of motor control and motor change occurring via learning and adaptation as it relates to movement variability, motivation, and ergonomics. Prerequisites: PEP 6840 and PEP 6860.	F (alternate years)	Spring 2015

Psychology

Course	Cr.	Title	Type	Details	Offered	Effective
PSY 3010	4	Psychological Statistics (QI)	Prerequisite Change	Add STAT 1045 as prerequisite in addition to STAT 1040 "STAT 1040 OR STAT 1045"	F, Sp, Su	Summer 2015

Teacher Education and Leadership

Course	Cr.	Title	Type	Details	Offered	Effective
TEPD 5300	1-6	Workshop in Mathematics Education	Add Multiple List	TEAL 6300	F, Sp, Su	Spring 2015
TEPD 5300			Course Description Change	Exploration of current topics and methods in mathematics education. In the past, topics have included: Common Core mathematics content, relevant mathematics in rural settings, integration of mathematics and children's literature.		
TEAL 5480		Methods and Materials in Gifted Education	Delete Course (remove dual list)	Remove dual list with TEAL 6480; then delete course. Course duplicates content of TEPD 5480		Spring 2015
TEAL 5490		Practicum: Gifted Strategies Applications	Delete Course (remove dual list)	Remove dual list with TEAL 6490; then delete course. Course duplicates content of TEPD 5490		Spring 2015
TEAL 6300	1-6	Workshop in Mathematics Education	Course Description Change	Exploration of current topics and methods in mathematics education. In the past, topics have included: Common Core mathematics content, relevant mathematics in rural settings, integration of mathematics and children's literature.		
TEAL 6300			Add Multiple List	TEPD 5300		
TEAL 6320	3	Theories and Models of Literacy	Title Change	needs to have the same title as TEAL 7320	Sp	Spring 2015
TEAL 6480	2	Methods and Materials in Gifted Education	Course Description/Prerequisite Change	Explores instructional and management models in gifted education. Requires development of instructional materials for use with gifted students. Corequisite: TEAL 6490	F, Sp, Su	Summer 2015

TEAL 6490	1	Practicum: Gifted Strategies Applications	Course Description Change	Instructional models and materials used in gifted education are applied to the classroom setting. Corequisite: TEAL 65480. P/F	F, Sp, Su	Spring 2015
TEPD 5435	2	Curriculum Development in the Education of Gifted and Talented Learners for Professional Educators	New Course	Explores curriculum models used in gifted education and the relationship between core curriculum and curriculum for gifted level learners. Requires development of curricular materials for use with gifted students. Corequisite: TEPD 5445	F, Sp, Su	Spring 2015
TEPD 5445	1	Practicum: Curriculum Writing in the Education of Gifted and Talented Learners by professional Educators	New Course	Requires application of models used in curriculum for gifted and talented learners to the writing of curriculum materials for use in classrooms with gifted and talented students. Corequisite: TEPD 5435. P/F	F, Sp, Su	Spring 2015
TEPD 5455	1	Practicum: Gifted Social and Emotional Needs Application for Professional Educators	Grade Type	P/F	F, Sp, Su	Spring 2015
TEPD 5480	2	Methods and Materials in Gifted Education for Professional Educators	Course Description Change	Explores instructional and management models in gifted education. Requires development of instructional materials for use with gifted students. Corequisite: TEPD 5490	F, Sp, Su	Spring 2015
TEPD 5490	1	Practicum: Gifted Strategies Applications for Professional Educators	Course Description Change	Instructional models and materials used in gifted education are applied to the classroom setting. Intended for practicing teachers. Corequisite: TEPD 5480. P/F	F, Sp, Su	Spring 2015

College of Engineering

Civil and Environmental Engineering

Course	Cr.	Title	Type	Details	Offered	Effective
CEE 2620	3	Environmental Engineering Microbiology	New Course	Foundations of environmental microbiology with emphasis on environmental engineering applications. Topics include: metabolism, classification, methods for growing and enumerating microorganisms, biogeochemical cycling of nutrients, pathogens in environmental media, indicator organisms, treatment of water and wastewater, and applications of microbial ecology to treating hazardous pollutants. Prerequisites: BIOL 1010, CHEM 1220	Sp	Spring 2015
CEE 3870	2	Professional/Technical Writing in Civil and Environmental Engineering	Delete Course	This was a course that we thought was deleted a while ago. We no longer teach it and have replaced it with ENGR 3080.		Spring 2015
CEE 5220/ 6220	3	Traffic Engineering	Prerequisite Change	Prerequisite: CEE 3210 and Admitted to the Professional Program.	Sp	Summer 2015
CEE 5240/ 6240	3	Urban and Regional Transportation Planning	Prerequisite Change	Prerequisites: CEE 3210 and Admitted to the Professional Program.	F	Fall 2015

Electrical and Computer Engineering

Course	Cr.	Title	Type	Details	Offered	Effective
ECE 3710	4	Microcontroller Hardware and Software	Prerequisite Change	Replace ECE 2250 for ECE 2290 because knowledge of the material in ECE 2250 instead of ECE 2290 is sufficient for entrance into ECE 3710	F	Fall 2015

Engineering

Course	Cr.	Title	Type	Details	Offered	Effective
ENGR 1500	1	Experience for Undergraduate Students	New Course	Students work as undergraduate research assistants under a faculty mentor. Through the course, students will learn and apply data collection, analysis, synthesis, and presentation skills specific to the research project. Repeatable for credit.	F, Sp, Su	Spring 2015
ENGR 3500	1	Research Experience for Undergraduate Students	New Course	Students work as undergraduate research assistants under a faculty mentor. Through the course, students will learn and apply data collection, analysis, synthesis, and presentation skills specific to the research project. Prerequisites: Admission to the Professional Program Repeatable for credit.	F, Sp, Su	Spring 2015

Mechanical & Aerospace Engineering

Course	Cr.	Title	Type	Details	Offered	Effective
MAE 5900	3	Cooperative Practice	Grade Type Change	The methods of evaluation are appropriate as a pass/fail course.	F, Sp, Su	Spring 2015

College of Humanities and Social Sciences

History

Course	Cr.	Title	Type	Details	Offered	Effective
HIST 3000	3	History Research Methods	Course No. Change	Previous: HIST 4989 this course will better serve our majors as the introductory course for our students beginning their upper-level course work. History is working to move our students through the major in a more thoughtful, directed manner.	F, Sp	Summer 2015
HIST 4990	3	Special Topics in History	Prerequisite Change	Prerequisite: HIST 3000 and Senior Standing	F, Sp, Su	Summer 2015

Language, Philosophy and Communication Studies

Course	Cr.	Title	Type	Details	Offered	Effective
CMST 4250	1-6	Advanced Internship	Course Description Change/Repeatable	Internship or cooperative education at a more professional level, with increased complexity, approved by the department and advisor. Internship project and number of credits must be approved by advisor. Course is repeatable up to a combined total of six credit hours.	F, Sp, Su	Spring 2015

Political Science

Course	Cr.	Title	Type	Details	Offered	Effective
POLS 6050	3	Qualitative Methods	New Course	This course offers an introduction to qualitative methods at the graduate level. It provides theoretical frameworks and practical knowledge and skills for conducting independent, robust political science projects that can be applied in different settings, issue-areas, and cultural terrains.	? (alternate years)	Spring 2015
POLS 6210	3	International Security	Title Change	The dept. has altered the description of the graduate program to provide greater clarity and better reflect the strengths of the current faculty. The name change denotes 6210 as a core class in the revamped curriculum and highlights to student that contemporary security issues encompass more than war and peace.	Sp (alternate years)	Spring 2015

S. J. and Jessie E. Quinney College of Natural Resources

Environment and Society

Course	Cr.	Title	Type	Details	Offered	Effective
ENVS 4110/ 6110	3	Human Dimensions of Wildlife Management	Title Change	Previous title: Fish and Wildlife Policy and Administration.	F	Fall 2015

Wildland Resources

Course	Cr.	Title	Type	Details	Offered	Effective
WILD 1800	3	Introduction to Geographic Information Science	Course Description Change	Introduces students to background and theory behind geographic information systems and spatial analysis. Students learn to integrate and analyze spatial information from different geographic sources. Includes a weekly laboratory section.	F, Sp	Spring 2015

College of Science

Geology

Course	Cr.	Title	Type	Details	Offered	Effective
GEO 5490/ 6490	3	Facies Analysis of Sedimentary Rocks	New Course	This course will cover topics including sedimentary processes and results, contacts, facies analysis, sequence stratigraphy, and implications of sedimentologic studies. Lectures, field trips, literature review, and geologic writing will be emphasized, with 6000 level credit earned through student presentations and a semester project. Prerequisite: GEO 3550	Sp (alternate years)	Spring 2015

Curriculum Subcommittee Agenda
October 2, 2014
(Addendum)

The following courses currently have STAT 1040 as a prerequisite. It is proposed that STAT 1045 (newly approved course) be added so that the prerequisite reads: "STAT 1040 **or** STAT 1045"

Course	Department	College	Effective
ASTE3600	Agricultural Systems Technology and Education	CAAS	Spring 2015
NDFS4420	Nutrition, Dietetics and Food Sciences	CAAS	Spring 2015
NDFS5200	Nutrition, Dietetics and Food Sciences	CAAS	Spring 2015
NDFS5210	Nutrition, Dietetics and Food Sciences	CAAS	Spring 2015
NDFS6200	Nutrition, Dietetics and Food Sciences	CAAS	Spring 2015
NDFS6210	Nutrition, Dietetics and Food Sciences	CAAS	Spring 2015
PSC 4600	Plants, Soils and Climate	CAAS	Spring 2015
MUSC4320	Music	CCA	Spring 2015
JCOM2020	Journalism and Communication	CHaSS	Spring 2015
PHIL2200	Languages, Philosophy and Communication Studies	CHaSS	Spring 2015
POLS3000	Political Science	CHaSS	Spring 2015
ANTH5250	Sociology, Social Work and Anthropology	CHaSS	Spring 2015
ANTH6250	Sociology, Social Work and Anthropology	CHaSS	Spring 2015
SOC 3120	Sociology, Social Work and Anthropology	CHaSS	Spring 2015
FCHD3130	Family, Consumer, and Human Development	EEJCEHS	Spring 2015
HEP 4200	Health, Physical Education and Recreation	EEJCEHS	Spring 2015
PRP 3050	Health, Physical Education and Recreation	EEJCEHS	Spring 2015
PSY 3010	Psychology	EEJCEHS	Spring 2015
ACCT2010	Accounting	HSB	Spring 2015
BUS 3400	Business	HSB	Spring 2015
FIN 3400	Economics and Finance	HSB	Spring 2015
MGT 4530	Management	HSB	Spring 2015
MGT 4570	Management	HSB	Spring 2015

Signatures:

College of Agriculture and Applied Science

Caine College of the Arts

College of Humanities and Social Sciences

Emma Eccles Jones College of Education and Human Services

Jon M. Huntsman School of Business

Other Business

Request from the Department of Computer Science to reduce the number of PhD credits.
(see attachment)

Request from the Department of Geology to discontinue the current BS in Applied Environmental Geoscience and create an emphasis in Applied Environmental Geoscience in the existing BS.
(see attachment)

Request from the Department of Mechanical and Aerospace Engineering to offer a PhD in Aerospace Engineering.
(see attachment)

CURRICULUM SUBCOMMITTEE MINUTES
4 September 2014

A meeting of the Curriculum Subcommittee of the Educational Policies Committee was held on 4 September 2014 at 2 p.m. in Old Main 136 (Champ Hall Conference Room).

Present: Ed Reeve, Chair, College of Agriculture and Applied Sciences
Nicholas Morrison, Caine College of the Arts
Jessica Hansen, Registrar's Office
Michele Hillard, Secretary
Chris Skousen (representing Frank Caliendo), Jon M. Huntsman School of Business
Steve Beck, Graduate Council
Kacy Lundstrom, Libraries
Mike Lyons, College of Humanities and Social Sciences
Karen Mock, S.J. & Jessie E. Quinney College of Natural Resources
Richard Mueller, College of Science
Scott Hunsaker, Emma Eccles Jones College of Education and Human Services
Norm Jones, General Education Subcommittee Chair
Dean Adams, College of Engineering
Nathan Straight, Regional Campuses
Betty Hassell, USU-Eastern

Absent: Derek Hastings, Graduate Studies Senator

Visitor: Heidi Kesler, Curriculum Retention
John Mortenson, Assistant Vice President
Larry Smith, Executive Senior Vice Provost

Michael Lyon moved to approve the minutes of the 4 April 2014 meeting. Scott Hunsaker seconded; motion approved.

Scott Hunsaker moved to approve the business of the College of Agriculture and Applied Sciences. Nick Morrison seconded; motion approved.

College of Agriculture and Applied Sciences

Department of Agricultural Systems Technology and Education

New Course

AV 2000	Aerodynamics Effective: Spring 2015	2 cr.
AV 2400	Commercial Multi-Engine Ground School Prerequisites: AV 2350 Effective: Spring 2015	2 cr.
AV 2410	Commercial Stage I Flight Prerequisites: AV 2350 Effective: Spring 2015	1 cr.

AV 2415 Commercial Stage II Flight 1 cr.
Prerequisites: AV 2350 and AV 2410
Effective: Spring 2015

AV 2670 Commercial Multi-Engine Certification 1 cr.
Prerequisites: AV 2410, 2415, and 2540
Effective: Spring 2015

AV 2870 Commercial Single-Engine Add-On 1 cr.
Prerequisites: AV 2670
Effective: Spring 2015

AV 3300 Air Transport Pilot Ground School 4 cr.
Prerequisites: AV 2670
Effective: Spring 2015

ASTE 6170 Program Evaluation 3 cr.
Effective: Spring 2015

HETR 1640 Hydraulic Excavator Operation 2 cr.
Prerequisites: Basic reading, writing, and math skills
Effective: Fall 2014

HETR 1670 Fork Lift Operation 2 cr.
Prerequisites: Basic reading, writing and math
Effective: Spring 2015

Title Change

ASTE 6160 Foundations of Adult Education 3 cr.
Previously: Foundations of Adult Education and Program Evaluation
Effective: Spring 2015

Credit Hour, Grade Mode Change

SLSC 1010 New Student Orientation 1 cr.
Previously: .5 cr.
Grade Mode: Pass Fail Only
Effective: Spring 2015

Title, Prerequisite, Course Description Change

AV 2540 Instrument Pilot Certification 1 cr.
Previously: Instrument Pilot Certification I
Prerequisite: AV 2350, AV 2410, AV 2415, and AV 2520 (may be taken concurrently)
Effective: Fall 2015

Department of Nutrition, Dietetics and Food Science

New Course

NDFS 5310/6310 Fundamentals of Nutrition Research 3 cr.
Prerequisites: NDFS 4020

Effective: Spring 2015

Department of Plants, Soils and Climate

Credit Hour Change

PSC 6220	Professional Experience in Water Efficient Landscaping Previously: 6 cr. Effective: Spring 2015	1-6 cr.
PSC 6240	Water Efficient Landscaping Seminar Previously: 2 cr. Effective: Spring 2015	1 cr.

Prerequisite Change

PSC 5430/6430	Plant Nutrition Add Prerequisite on PSC 5430 only: PSC 3500 or BIOL 4400 or consent of instructor Effective: Summer 2015	2 cr.

Nick Morrison moved to approve the business of the Caine College of the Arts. Norm Jones seconded; motion approved.

Caine College of the Arts

Department of Art and Design

New Course

ARTH 4910	Senior Thesis in Art History and Visual Studies Prerequisites: Instructor Signature Effective: Spring 2015	3 cr.

Department of Theatre Arts

Grade Mode Change

THEA 5390	Student Teaching Seminar Grade Mode Standard Letter Grade Previously: Pass/Fail Only Effective: Spring 2015	3 cr.

Scott Hunsaker moved to approve the business of the Emma Eccles Jones College of Education and Human Services. Dick Mueller seconded; motion approved.

Emma Eccles Jones College of Education and Human Services

Department of Family, Consumer and Human Development

New Course

FCHD 5350	Financial Coaching Effective: Fall 2014	3 cr.

Department of Health, Physical Education and Recreation

Title Change

HEP 5300	Grant Writing for Health Educators Previously: Grant Proposal Writing Effective: Spring 2015	3 cr.

PEP 7070 Grant Writing for Pathokinesiology 1 cr.
Previously: Grant Writing
Effective: Spring 2015

Prerequisite Change

PRP 3000 Designing Recreation Experiences 3 cr.
Prerequisite: PRP 1000
Effective: Summer 2015

PRP 4750 Internship in Recreation Services 6 cr.
Prerequisite: PRP 1000, 3000, 3025, 3900, 4250, 4550 and 4700
Effective: Summer 2015

Department of Psychology

Title, Prerequisite, Course Description Change

PSY 3500 Research Methods in Psychology 3 cr.
Previously Scientific Thinking and Methods in Psychology
Prerequisite: PSY 1010 and ENGL 2010
Effective: Summer 2015

School of Teacher Education and Leadership

Course Description change

ELED 1010 Orientation to Elementary Education 3 cr.
Effective: Summer 2015

Prerequisite Change

ELED 3000 Historical, Social, and Cultural Foundations of Education and School Practicum (CI) 4 – 6 cr.
Prerequisites: Admission to an Elementary Education program; grade of B- better in ELED 1010 and FCHD 1500.
Effective: Summer 2015

ELED 3005 Beginning Classroom Management 1 cr.
Prerequisites: Admission to an Elementary Education program; grade of B- better in ELED 1010 and FCHD 1500 and admission to Level II of the SODIA teacher education program.
Effective: Summer 2015

ELED 3100 Classroom Reading Instruction 3 cr.
Prerequisites: Admission to an Elementary Education program; grade of B- better in ELED 1010 and FCHD 1500 and admission to teacher education.
Effective: Summer 2015

ELED 4000 Teaching Science and Practicum Level III 3 cr.
Prerequisites: Minimum Level II GPA of 2.75; grade of B- or better in ELED 3000, ELED 3005, ELED 3100, SPED 4000, PSY 3660, and SPED 5530 or ITLS 4015. For

Elementary Education program students not earning a dual certificate in Special Education, a B- or better is also required in ELED 4150. Admission to teacher education; completion of Level II and BIOL 1010 with a lab, or USU 1350: PHYS 1200 and GEO 1010 or their equivalents.
Effective: Summer 2015

ELED 4005 Intermediate Classroom Management 1 cr.
Prerequisites: Minimum Level II GPA of 2.75; grade of B- or better in ELED 3000, ELED 3005, ELED 3100, SPED 4000, PSY 3660, and SPED 5530 or ITLS 4015. For Elementary Education program students not earning a dual certificate in Special Education, a B- or better is also required in ELED 4150 and admission to Level III of the SODIA teacher education program.
Effective: Summer 2015

ELED 4030 Teaching Language Arts and Practicum Level III (CI) 3 cr.
Prerequisites: Minimum Level II GPA of 2.75; grade of B- or better in ELED 3000, ELED 3005, ELED 3100, SPED 4000, PSY 3660, and SPED 5530 or ITLS 4015. For Elementary Education program students not earning a dual certificate in Special Education, a B- or better is also required in ELED 4150 and admission to teacher education.
Effective: Summer 2015

ELED 4040 Assessment and Instruction for Struggling Readers (CI) 3 cr.
Prerequisites: Minimum Level II GPA of 2.75; grade of B- or better in ELED 3000, ELED 3005, ELED 3100, SPED 4000, PSY 3660, and SPED 5530 or ITLS 4015. For Elementary Education program students not earning a dual certificate in Special Education, a B- or better is also required in ELED 4150 and admission to teacher education, ELED 3100.
Effective: Summer 2015

ELED 4050 Teaching Social Studies and Practicum Level III 3 cr.
Prerequisites: Minimum Level II GPA of 2.75; grade of B- or better in ELED 3000, ELED 3005, ELED 3100, SPED 4000, PSY 3660, and SPED 5530 or ITLS 4015. For Elementary Education program students not earning a dual certificate in Special Education, a B- or better is also required in ELED 4150 and Admission to teacher education.
Effective: Summer 2015

ELED 4060 Teaching Mathematics and Practicum Level III 3 cr.
Prerequisites: Minimum Level II GPA of 2.75; grade of B- or better in ELED 3000, ELED 3005, ELED 3100, SPED 4000, PSY 3660, and SPED 5530 or ITLS 4015. For Elementary Education program students not earning a dual certificate in Special Education, a B- or better is also required in ELED 4150 and admission to teacher education.
Effective: Summer 2015

ELED 4150 Assessment and Differentiation Across the Curriculum 2 cr.

Prerequisites: Admission to and Elementary Education program; grade of B- better in ELED 1010 and FCHD 1500 and admission to the Elementary Education-Teacher Education Program
Effective: Summer 2015

ELED 4480 Early Childhood Education Kindergarten Through Grade 3 3 cr.
Prerequisites: Admission to and Elementary Education program; grade of B- better in ELED 1010 and FCHD 1500.
Effective: Summer 2015

ELED 5050 Student Teaching – Kindergarten 3 – 6 cr.
Prerequisite: Minimum Level III GPA of 2.75; grade of B- or better in ELED 4000, ELED 4005, ELED 4030, ELED 4040, ELED 4060 and ELED 4480.
Effective: Summer 2015

ELED 5100 Student Teaching – Primary (Grades 1-3) 6 cr.
Prerequisite: Minimum Level III GPA of 2.75; grade of B- or better in ELED 4000, ELED 4005, ELED 4030, ELED 4040, and ELED 4060.
Effective: Summer 2015

ELED 5150 Student Teaching – Elementary (Grades 4-6) 6 cr.
Prerequisite: Minimum Level III GPA of 2.75; grade of B- or better in ELED 4000, ELED 4005, ELED 4030, ELED 4040, and ELED 4060.
Effective: Summer 2015

ELED 5250 Advanced Classroom Management and Student Teaching Seminar 3 cr.
Prerequisite: Minimum Level III GPA of 2.75; grade of B- or better in ELED 4000, ELED 4005, ELED 4030, ELED 4040, and ELED 4060.
Effective: Summer 2015

Dean Adams moved to approve the business of the College of Engineering. Norm Jones seconded; motion approved.

College of Engineering

Department of Biological Engineering

New Course

BENG 6510/7510 Graduate Seminar 1 cr.
Effective: Spring 2015

Department of Civil and Environmental Engineering

Delete Course

CEE 3010 Mechanics of Materials 2 cr.
Effective: Spring 2015

Inactivate Course

CEE 3030 Uncertainty in Engineering Analysis 2 cr.
Effective: Spring 2015

Prerequisite Change

CEE 3610 Environmental Management 3 cr.
Prerequisite: Breadth Life Science class; CHEM 1210 and MATH 1210
Effective: Summer 2015

CEE 3880 Civil Engineering Design I 1 cr.
Prerequisite: ENGR 3080 and admittance to the Professional Program or Graduate Standing.
Effective: Summer 2015

Department of Electrical and Computer Engineering

New Course

ECE 5760 Hardware and Embedded Systems Security 4 cr.
Prerequisites: ECE 3710 and ECE 3410 and admission to the Professional Program of Graduate Standing.
Effective: Fall 2014

Prerequisite Change

ECE 5720 Computer Systems Programming and Architecture 3 cr.
Prerequisite: ECE 2700 and admission to the Professional Program, or Graduate Standing and ECE 3710 (can be taken concurrently)
Effective: Summer 2015

ECE 3810 Engineering Professionalism 1 cr.
Prerequisite: Admission to the Professional Program and ENGR 3080 (can be taken concurrently)
Effective: Summer 2015

Mike Lyons moved to approve the business of the College of Humanities and Social Sciences. Norm Jones seconded; motion approved.

College of Humanities and Social Sciences

Department of History

Course Number Change

HIST 3000 History Research Methods 3 cr.
Previously: HIST 4989
Effective: Summer 2015

Add Multiple List

HIST 3220 Medieval European Civilization, 500 – 1500 (DHA/CI) 3 cr.
Add Multiple List of RELS 3220
Effective: Spring 2015

HIST 3482 Ancient China to 1800 3 cr.
Add Multiple List of RELS 3482
Effective: Spring 2015

Department of Languages, Philosophy and Communication Studies

New Course

IELI 1000	Conversational English Prerequisite: IELI placement exam Grade Mode: Pass/Fail Only Repeatable for credit Effective: Spring 2015	3 cr.
CMST 3270	Culture and Public Discourse Effective: Spring 2015	3 cr.
CMST 4470	Qualitative Research in Communication Studies Effective: Spring 2015	3 cr.
CMST 5800	Communication Studies Senior Capstone Effective: Spring 2015	1 cr.
PHIL 3580	Ethics and Economic Life University Studies Designation DHA Effective: Spring 2015	3 cr.

Title and Course Number Change

PHIL 3700	Political Philosophy (DHA) Previously: PHIL 4610 Previous Title: Social and Political Philosophy Effective: Summer 2015	3 cr.

Department of Sociology, Social Work and Anthropology

Title, Course Number, and Description Change

ANTH 3140	Anthropology of Sex and Gender (DSS) Previously: ANTH 5100/6100 Previous Title: Gender, Sex and Health Effective: Summer 2015	3 cr.

University Studies Request

SW 4100	Social Work Research Add University Studies Designation of CI Effective: Fall 2014	3 cr.

Karen Mock moved to approve the business of the Quinney College of Natural Resources. Dick Mueller seconded; motion approved.

S. J. and Jessie E. Quinney College of Natural Resources

Course Number Change

NR 2000	Natural Resources Professional Orientation Previously: ENVS/WATS/WILD 2000 Effective: Fall 2015	1 cr.

Department of Environment and Society

Credit Hour Change

ENVS 6530	Natural Resources Administration Previously: 2 cr. Effective: Spring 2015	3 cr.

Dick Mueller moved to approve the business of the College of Science. Scott Hunsaker seconded; motion approved.

College of Science

Department of Biology

Delete Course

BIOL 4040/6040	Programming and Database Management for Biologists I Effective: Fall 2014	3 cr.
BIOL 4050/6050	Programming and Database Management for Biologists II Effective: Spring 2015	3 cr.

Other Business

Dick Mueller moved to open the agenda for changes Norm Jones seconded the motion; motion approved.

Math & Stats prerequisites
Math 1010 deleted ACT/SAT scores add them back
Math 1030 lower ACT from 23 to 21 SAT from 540 to 500
Math 1050 allow Math 995 as prerequisite
Stat 1040 drop entrance requirements ACT 19 SAT 460 allow Math 995 as prerequisite

Norm Jones moved to approve the additions in Mathematics & Statistics. Dean Adams seconded; motion approved.

Curriculum Meeting Schedule for 2014-2015 Academic Year

Meeting Date	Agenda Items Due
September 4, 2014	August 21, 2014
October 2, 2014	September 18, 2014
November 6, 2014	October 23, 2014
December 4, 2014	November 20, 2014
January 8, 2015	December 11, 2014
February 5, 2015	January 22, 2015
March 5, 2015	February 19, 2015
April 2, 2015	March 19, 2015

Repeatable courses from USU-Eastern were approved this past summer.

The Gen Ed website was redesigned and updated. Norm Jones asked that people take some time and familiarize themselves with the website.

Meeting adjourned at 2:20 pm.

Cover/Signature Page - Abbreviated Template/Abbreviated Template with Curriculum

Institution Submitting Request: *Utah State University*
Proposed Title:
Currently Approved Title:
School or Division or Location:
Department(s) or Area(s) Location: *Department of Computer Science, College of Engineering*
Recommended Classification of Instructional Programs (CIP) Code[1] (for new programs):
Current Classification of Instructional Programs (CIP) Code (for existing programs): *11.07*
Proposed Beginning Date (for new programs): *upon approval*
Institutional Board of Trustees' Approval Date:

Proposal Type (check all that apply):

Regents' General Consent Calendar Items		
R401-5 OCHE Review and Recommendation; Approval on General Consent Calendar		
SECTION NO.		**ITEM**
5.1.1	☐	Minor*
5.1.2	☐	Emphasis*
5.2.1	☐	(CER P) Certificate of Proficiency*
5.2.3	☐	(GCR) Graduate Certificate*
5.4.1	☐	New Administrative Unit
	☐	Administrative Unit Transfer
	☐	Administrative Unit Restructure
	☐	Administrative Unit Consolidation
5.4.2	☐	Conditional Three-Year Approval for New Centers, Institutes, or Bureaus
5.4.3	☐	New Center
	☐	New Institute
	☐	New Bureau
5.5.1	☐	Out-of-Service Area Delivery of Programs
5.5.2	☐	Program Transfer
	☒	Program Restructure
	☐	Program Consolidation
5.5.3	☐	Name Change of Existing Programs
5.5.4	☐	Program Discontinuation
	☐	Program Suspension
5.5.5	☐	Reinstatement of Previously Suspended Program
	☐	Reinstatement of Previously Suspended Administrative Unit

**Requires "Section V: Program Curriculum" of Abbreviated Template*

Chief Academic Officer (or Designee) Signature:
I certify that all required institutional approvals have been obtained prior to submitting this request to the Office of the Commissioner.

Signature **Date:** *09/04/2014*
Printed Name: *Nicholas S. Flann*

1 CIP codes must be recommended by the submitting institution. For CIP code classifications, please see http://nces.ed.gov/ipeds/cipcode/Default.aspx?y=55.

Program Request - Abbreviated Template
Utah State University
Ph.D. Computer Science
09/01/2014

Section I: Request

The Computer Science Department requests to reduce the total minimum number of credit hours required to complete a Ph.D. to 70 hours, a reduction from the current value of 90. The change is motivated by the desire to bring USU Computer Science in line with other Ph.D. programs within the College of Engineering and with other CS Ph.D. programs at peer institutions, which require no more than 72 hours. We anticipate that this change will increase the competitiveness and effectiveness of our PhD program while having a minimal impact on aggregate instructional activities since reductions in credit hours per student will be offset by an increasing PhD program and student enrollment in classes.

All numbers are minimum credit hours	Existing Ph.D. Program		**New Proposed Ph.D. program**	
	without MS	with MS	**without MS**	**with MS**
7000 level CS	12	12	**9**	**9**
Awarded from MS	0	30 (fixed)	**0**	**0 to 30**
Seminar CS7900	2	2	**2**	**2**
Dissertation	27	27	**18**	**18**
Additional courses	33	3	**21**	**3**
Remaining courses/dissertation			**20**	**38 – (hours awarded from MS)**
Minimum Total	90	90	**70**	**70**

There are three principal areas of change: a) the number of minimum dissertation credits is reduced by 9 hours, b) the minimum number of PhD classes is reduced by one class, c) satisfying the remaining credits needed becomes more flexible.

Section II: Need

Computer Science is one of the fastest growing job markets in the world, increasing the demand for graduates at BS, MS and PhD levels. New graduates in the USU CS department are experiencing multiple job offers at salaries higher than previous years. Significantly, this trend also applies to the PhD level principally because computer-related companies (such as Microsoft, Amazon, Google, Apple etc.) have growing internal research labs that seek PhDs to lead research and development of future products. Research shows that more than half of PhD graduates work in industry rather than academia (Taulbee Survey http://cra.org/resources/taulbee/))

According to the Computing Research Association annual Taulbee Survey, Computer Science programs around the country are producing more PhDs than ever before, but increasing demand has kept pace and this additional supply has not diminished employment or salary. Indeed, the Taulbee Survey reports an almost 100% placement and employment of PhDs in professional jobs. Salaries available from the Bureau of Labor Statistics (http://www.bls.gov/ooh/computer-and-information-technology/home.htm) give the median salary for computer research scientists at $100,800 and tenure-track assistant professors at $85,000 (for smaller public universities) and $100,000 (for large private universities).

In response to these rapid changes and positive future prospects the USU CS PhD program needs to modernize to become more competitive, efficient and tailored to current and future market conditions. The principal problem with the current program is that it takes too long to complete because of unnecessary and burdensome requirements. Specifically, the current minimum 90 credit hour requirement is outdated and exceptionally high compared to peer institutions within the intermountain region and around the country as summarized below (click on the university name to review the complete requirements, or follow the link in the next table):

University	Total	Min. Class	Min. Dissertation
University of Utah	50	27	14
BYU	66	48	18
Montana State Univ.	60	18	18
University of Nevada	72	30	24
Univ. of Pittsburgh	72	36	36
Virginia Commonwealth Univ.	70	42	18
UNC Charlotte	72	18	36
Iowa State Univ.	72	18	36

This reduction in credit hours to 70 brings the USU program into the range of peer institutions and combined with the new streamlined exam and student evaluation procedures (discussed below), will increase the effectiveness and PhD productivity of the department, but not diminish the quality of the PhD product. In fact, it is anticipated that a process more focused on productivity than credit hours will increase the quality of our PhDs.

University	Web link
University of Utah	http://www.cs.utah.edu/graduate/hb2013-14/gradhbk2013-14-phd_cs.html
BYU	https://cs.byu.edu/graduate-policy-handbook-phd-program
Montana State Univ.	http://www.cs.montana.edu/phd-courses.html
University of Nevada	http://www.unr.edu/degrees/computer-science-and-engineering/phd?view=requirements
Univ. of Pittsburgh	https://cs.pitt.edu/grad/phd.php
Virginia Commonwealth Univ.	http://www.pubapps.vcu.edu/Bulletins/graduate/?did=20281
UNC Charlotte	https://cci.uncc.edu/degree-requirements-current
Iowa State Univ.	https://www.cs.iastate.edu/graduate/cs_phd.php

In tandem with this proposed change, the CS department has implemented a new exam schedule (http://cs.usu.edu/htm/ph-d-examination-policy/) and is introducing a new annual evaluation policy of PhD student's productivity similar to the procedure for faculty evaluations. Students enter data describing their research, teaching and service contributions into a digital measure-like system and are then ranked using a published rubric. Student progress is reviewed by the departmental graduate committee and anonymized data is presented to the faculty, enabling faculty to identify poor and excellent students. The department then recognizes excellent students with awards during the annual graduate student reception. Students making unacceptable progress will be warned their first year and then if no improvement is made the second year, departmental support will be withdrawn.

Section III: Institutional Impact

It is anticipated that this change will enable the CS department to increase enrolment within the CS PhD program while maintaining or increasing admission standards because we will be offering a more competitive product.

No change in administrative structure will be required.

The CS department is growing in faculty and in students so it is anticipated that planned and actual new hires in faculty will fully support these proposed changes in the PhD program. No new staff will be needed.

Current facilities will continue to be adequate.

Section IV: Finances

We anticipate no major cost increases or savings from this change.

In addition to those standard procedures in place for PhD and plan A MS students, faculty in the CS department include monies for tuition awards in their grant proposals as required by the COE.

Cover/Signature Page - Abbreviated Template/Abbreviated Template with Curriculum

Institution Submitting Request: Utah State University
Proposed Title: B.S. in Geology with Applied Environmental Geoscience Emphasis (new emphasis)
Currently Approved Title: B.S. in Applied Environmental Geoscience (to be discontinued)
School or Division or Location: College of Science
Department(s) or Area(s) Location: Geology
Recommended Classification of Instructional Programs (CIP) Code2 (for new programs): 40.0601
Current Classification of Instructional Programs (CIP) Code (for existing programs): 40.0699
Proposed Beginning Date (for new programs): 01/07/2015
Institutional Board of Trustees' Approval Date:

Proposal Type (check all that apply):

Regents' General Consent Calendar Items		
R401-5 OCHE Review and Recommendation; Approval on General Consent Calendar		
SECTION NO.		**ITEM**
5.1.1	☐	Minor*
5.1.2	X	Emphasis*
5.2.1	☐	(CER P) Certificate of Proficiency*
5.2.3	☐	(GCR) Graduate Certificate*
5.4.1	☐	New Administrative Unit
	☐	Administrative Unit Transfer
	☐	Administrative Unit Restructure
	☐	Administrative Unit Consolidation
5.4.2	☐	Conditional Three-Year Approval for New Centers, Institutes, or Bureaus
5.4.3	☐	New Center
	☐	New Institute
	☐	New Bureau
5.5.1	☐	Out-of-Service Area Delivery of Programs
5.5.2	☐	Program Transfer
	☐	Program Restructure
	☐	Program Consolidation
5.5.3	☐	Name Change of Existing Programs
5.5.4	X	Program Discontinuation
	☐	Program Suspension
5.5.5	☐	Reinstatement of Previously Suspended Program
	☐	Reinstatement of Previously Suspended Administrative Unit

**Requires "Section V: Program Curriculum" of Abbreviated Template*

Chief Academic Officer (or Designee) Signature:
I certify that all required institutional approvals have been obtained prior to submitting this request to the Office of the Commissioner.

2 CIP codes must be recommended by the submitting institution. For CIP code classifications, please see http://nces.ed.gov/ipeds/cipcode/Default.aspx?y=55.

Program Request - Abbreviated Template
Utah State University
Bachelor of Science in Geology with an Applied Environmental Geoscience Emphasis
08/22/2014

Section I: Request

This request is to discontinue the current Bachelor of Science degree in Applied Environmental Geoscience and instead create an emphasis in Applied Environmental Geoscience in the existing Bachelor of Science degree in Geology.

Section II: Need

The Bachelor of Science (BS) in Applied Environmental Geoscience (AEG) has been in place for more than four years, but very few students have chosen to pursue this degree. From interviews with these students as well as other Geology majors, a serious concern that has been expressed is the value of the AEG degree, both in terms of its employability following graduation and its desirability for prospective graduate programs. Consequently, the Department of Geology at Utah State University has decided to discontinue the BS in AEG and instead offer an AEG emphasis in the existing BS in Geology due to the professional recognition of USU's Geology BS that already exists among both potential employers and other institutions of higher education that offer graduate degrees in the Earth and Geological Sciences.

Furthermore, because of concerns expressed by AEG majors during interviews regarding some of the elective courses for the BS in AEG, the Department of Geology has reassessed the curriculum and has made changes to the electives for the AEG emphasis in the BS in Geology that will make it more beneficial and attractive to students, and thus more enticing to potential majors. Please note, however, that the total number of credit hours required for both the BS in AEG and the AEG emphasis in the BS in Geology is exactly the same.

Finally, while the current AEG majors will be accommodated to allow completion of their degrees according to the existing requirements after the program is discontinued, all of the students interviewed have expressed their desire to switch to the AEG emphasis in Geology if it is approved for the reasons described above.

Section III: Institutional Impact

The proposed change is not anticipated to affect enrollments in any other instructional programs of affiliated departments or programs, nor will the proposed change affect any existing administrative structures. No changes in faculty or staff will be required, nor will any new physical facilities or modification to existing facilities be required. No equipment will need to be committed to initiate this change.

Section IV: Finances

The proposed change is not anticipated to result in any costs or savings to the Geology Department, College of Science, or Utah State University, nor are any budgetary impacts on other programs or units within Utah State University anticipated.

Section V: Program Curriculum

All Program Courses (with New Courses in Bold)

Course Prefix and Number	Title	Credit Hours
Required Courses	GEO 1110 - Physical Geology	3
	GEO 1115 - Physical Geology Laboratory	1
	GEO 3200 - Earth Through Time	4
	GEO 3500 - Minerals and Rocks	4
	GEO 3550 - Sedimentation and Stratigraphy	4
	GEO 3600 - Geomorphology	4
	GEO 3700 - Structural Geology	4
	GEO 4700 - Geologic Field Methods	3
	GEO 5200 - Geology Field Camp	5
	GEO 5600 - Geochemistry	3
	CHEM 1210 - Principles of Chemistry I	4
	CHEM 1215 - Principles of Chemistry Lab I	1
	CHEM 1220 - Principles of Chemistry II	4
	CHEM 1225 - Principles of Chemistry Lab II	1
	MATH 1210 - Calculus I	4
	STAT 3000 - Statistics for Scientists	3
	PHYS 2210 - Physics for Sci and Engr I	4
	PHYS 2215 - Physics for Sci and Engr Lab I	1
	BIOL 1610 - Biology I	4
	BIOL 1620 - Biology II	4
	GEOG 1800 - Intro to GIS	3
	Sub-Total	**68**
Elective Courses	PSC 3000 - Fundamentals of Soil Sci **and**	4
	PSC 5130 – Soil Genesis, Morph, and Class	4
	OR	
	WATS 3700 – Fund of Watershed Sci **and**	3
	WATS 4490 – Small Watershed Hydrology	4
	GEO 5630 – Geologic Image Analysis **or**	3
	WATS 4930 – Adv GIS and Spatial Anal **or**	3
	WATS 5003 – Remote Sensing Land Surf **or**	4
	WILD 5750 – Applied Remote Sensing	3
	BIOL 2220 – General Ecology **or**	3
	CHEM 3650 – Environmental Chemistry **or**	3
	PSC 3820 – Climate and Climate Change	3
	Sub-Total	**13 - 15**
Track/Options (if applicable)		
	Sub-Total	
*(This is the same number of credits as the BS in AEG)	**Total Number of Credits**	**81 - 83**

Program Schedule

Freshman Year

Fall Semester (13 credits)

GEO 1110 - Physical Geology (4)
GEO 1115 - Physical Geology Laboratory (1)
CHEM 1210 - Principles of Chemistry I (4)
CHEM 1215 - Principles of Chemistry Laboratory I (1)
MATH 1210 - Calculus I (4)

Spring Semester (16 credits)

GEO 3200 - Earth Through Time (4)
GEO 3500 - Minerals and Rocks (4)
CHEM 1220 - Principles of Chemistry II (4)
CHEM 1225 - Principles of Chemistry Laboratory II (1)
STAT 3000 - Statistics for Scientists (3)

Sophomore Year

Fall Semester (16 credits)

GEO 3550 - Sedimentation and Stratigraphy (4)
GEOG 1800 - Introduction to Geographic Information Systems (3)
PHYS 2210 - Physics for Science and Engineering I (4)
PHYS 2215 - Physics for Science and Engineering Laboratory I (1)
BIOL 1610 - Biology I (4)

Spring Semester (13 credits)

GEO 3700 - Structural Geology (4)
PHYS 2220 - Physics for Science and Engineering II (4)
PHYS 2225 - Physics for Science and Engineering Laboratory II (1)
BIOL 1620 - Biology II (4)

Junior Year

Fall Semester (7 credits)

GEO 3600 - Geomorphology (4)
GEO 4700 - Geologic Field Methods (3)

Spring Semester (6 - 7 credits)

PSC 3000 - Fundamentals of Soil Science (4) **or**
WATS 3700 - Fundamentals of Watershed Science (3)
BIOL 2220 - General Ecology (3) **or**
CHEM 3650 - Environmental Chemistry (3) **or**
PSC 3820 - Climate and Climate Change (3)

Summer Semester (5 credits)

GEO 5200 - Geology Field Camp (5)

Senior Year

Fall Semester (0 - 7 credits)

PSC 5130 - Soil Genesis, Morphology, and Classification (4) (if PSC 3000 taken in previous spring)
WILD 5750 - Applied Remote Sensing (3) (if neither WATS 4930 nor WATS 5003 taken in following spring)

Spring Semester (0 - 8 credits)

WATS 4490 - Small Watershed Hydrology (4) (if WATS 3700 taken in previous spring)
WATS 4930 - Advanced GIS and Spatial Analysis (3) **or**
WATS 5003 - Remote Sensing of Land Surfaces (4) (if WILD 5750 not taken in fall)

Cover/Signature Page – Full Template

Institution Submitting Request: *Utah State University*
Proposed Title: *PhD Degree in Aerospace Engineering*
School or Division or Location: *College of Engineering*
Department(s) or Area(s) Location: *Mechanical and Aerospace Engineering*
Recommended Classification of Instructional Programs (CIP) Code[3] : *14.0201*
Proposed Beginning Date: *08/01/2015*
Institutional Board of Trustees' Approval Date: *MM/DD/YEAR*

Proposal Type (check all that apply):

Regents' Agenda Items		
R401-4 and R401-5 Approval by Committee of the Whole		
SECTION NO.		**ITEM**
4.1.1	☐	(AAS) Associate of Applied Science Degree
4.1.2	☐	(AA) Associate of Arts Degree
	☐	(AS) Associate of Science Degree
4.1.3	☐	Specialized Associate Degree
4.1.4	☐	Baccalaureate Degree
4.1.5	☐	K-12 School Personnel Programs
4.1.6	☐	Master's Degree
4.1.7	X	Doctoral Degree
5.2.2	☐	(CER C) Certificate of Completion
5.2.4	☐	Fast Tracked Certificate

Chief Academic Officer (or Designee) Signature:
I certify that all required institutional approvals have been obtained prior to submitting this request to the Office of the Commissioner.

_____
Signature **Date:**

Printed Name:

R 401 Executive Summary
Utah State University
PhD Degree in Aerospace Engineering
Department of Mechanical and Aerospace Engineering
August 2014

Program Description
The Department of Mechanical and Aerospace Engineering (MAE) at USU seeks to offer a new PhD (Doctor of Philosophy) degree program in Aerospace Engineering to complement the current MS in Aerospace Engineering and the current MS and PhD programs in Mechanical Engineering. Aerospace Engineering is the primary branch of engineering associated with design, construction, testing, and technology development for all types of flying vehicles including airplanes, rockets, missiles, and spacecraft. Currently, the PhD in Mechanical Engineering degree is being used to accommodate both mechanical and aerospace engineering graduate students who successfully complete the Mechanical Engineering doctoral program. The proposed new degree program will establish a separate degree path for aerospace engineering graduate students and attract new students that specifically desire a PhD graduate degree in Aerospace Engineering. This can be accomplished without any change to our current faculty, staff, and coursework.

Role and Mission Fit
The proposed PhD graduate degree program in Aerospace Engineering is consistent with the role of USU as set forth in Regent's Policy R312. The PhD in Aerospace Engineering will support the Regent's mission for a doctoral granting institution "*through discovery, creation, and transmission of knowledge through a graduate educational program."* More specifically, Regent's Policy R312-4.1.2 states that "*the mission of Utah State University is to be one of the nation's premier student centered land grant and space grant universities by fostering the principle that academics come first; by cultivating diversity of thought and culture; and by serving the public through learning, discovery, and engagement.*" Additionally, the proposed program is complementary to ongoing research at the Space Dynamics Lab (SDL). In a letter of support from the USU Research Foundation (USURF), President Scott Hinton states that *"USURF and SDL would welcome and encourage an Aerospace PhD at USU. We think that the program you are proposing would complement and support much of the work that is the core of SDL's business."*

Faculty
The MAE department **has 16 tenured and tenure-track faculty members, all with doctoral degrees. Eight faculty members, including** four with doctoral degrees in Aerospace Engineering, **have expertise directly related to the proposed aerospace engineering program as well as current research projects in aerospace that will support the proposed PhD degree program.**

Labor Market Demand
Nearly 80,000 engineers are currently employed in aerospace, significantly higher than the number employed in computer hardware, nuclear engineering, biomedical engineering or chemical engineering, among other fields. (IEEE, http://www.todaysengineer.org/2012/may/career-focus.asp) Over the decade from 2012 to 2022, the Bureau of Labor Statistics projects a 7% growth in employment for aerospace engineers. Overall, Utah is one of the top ten states in the nation in the concentration of aerospace employment. Given the large concentration of aerospace industries in Utah, USU graduates with a PhD in aerospace engineering will clearly be "first in line" to fill these available high-paying positions; keeping "home-grown" talent "close to home."

Student Demand
Presently the MAE department supports a PhD in Mechanical Engineering. A new PhD in Aerospace Engineering will provide graduate students with an option that is more focused on the specialized topics that are central to aerospace engineering. Graduates with a PhD in aerospace engineering will be better prepared and more competitive in the aerospace industry.

Students wanting a PhD degree in aerospace engineering will be able to stay in Utah rather than go out of state. As stated previously, this change will help to keep home-grown talent close to home.

When the PhD in Aerospace Engineering program is approved, there exists a potential for an initial small decrease in the number of students pursuing a PhD in Mechanical Engineering. However, because of the previously-described market demand and the desire of many students to choose a program with a PhD in Aerospace Engineering, overall enrollment is in MAE's PhD programs is projected to increase during the next five years.

Statement of Financial Support

Indicate from which of the following the funding for this new degree program will be generated:

- Legislative Appropriation ..... ☐
- Grants..... ☒
- Reallocated Funds..... ☒
- Tuition dedicated to the program..... ☐
- Other ..... ☒

The MAE's full-time PhD graduate students receive graduate research or graduate teaching assistantships to help finance their education. All of the research assistantships are supported by grants and contracts initiated by the faculty. These grants and contracts also provide research equipment, materials, and supplies used by the students in their courses and research associated with the PhD degree.

Similar Programs Already Offered in the USHE

Currently, there no Aerospace Engineering PhD degree within the Utah System of Higher Education. Thus, offering the Aerospace PhD degree better positions USU to capture regional talent that would otherwise leave the state. A flourishing PhD program in aerospace engineering will likely attract students who would not have previously considered USU.

R 401 Proposal
PhD Degree in Aerospace Engineering
Department of Mechanical and Aerospace Engineering
Utah State University

Section I: The Request

Utah State University (USU) requests approval to offer the Doctor of Philosophy degree in Aerospace Engineering effective Fall Semester 2015. The program has been approved by the institutional Board of Trustees on xx.

Section II: Program Description

Overview

The Department of Mechanical and Aerospace Engineering (MAE) at USU seeks to offer a new PhD (Doctor of Philosophy) degree program in Aerospace Engineering to complement the current MS in Aerospace Engineering and the current MS and PhD programs in Mechanical Engineering. Aerospace Engineering is the primary branch of engineering associated with design, construction, testing, and technology development for all types of flying vehicles including airplanes, rockets, missiles, and spacecraft. Currently, the PhD in Mechanical Engineering degree is being used to accommodate both mechanical and aerospace engineering graduate students who successfully complete the Mechanical Engineering doctoral program. The proposed new degree program will establish a separate degree path for aerospace engineering graduate students and attract new students that specifically desire a PhD graduate degree in Aerospace Engineering. MAE offers sufficient foundation and aerospace courses that provide the breadth and depth needed for a quality aerospace PhD degree program without the need to develop any new courses.

PhD Degree Requirements

The PhD degree requires 72 credit hours beyond the bachelor's degree and 42 credit hours beyond the Master's degree and will comply with all Graduate School requirements for PhD programs of study including a formal dissertation. All students must pass 3 PhD Qualifier Exams, a dissertation proposal defense, and a final dissertation defense. PhD degree requirements also consists of core courses (5000-, 6000-, and 7000-level) in aerospace engineering, advanced mathematics, technical electives, and quality aerospace research. A summary of PhD degree requirements is provided below.

Aerospace Engineering (PhD) Degree Requirements	
Beyond the BS - 72 credits	**Beyond the MS** - 42 credits
Coursework*: 24 credits (minimum) Aerospace Core • must include MAE 5500 and 5560 if not previously completed 21 credits (minimum) Aerospace Electives/Other • No more than 6 credits MAE 7930 Doctoral Publications • No more than 6 credits MAE 5930/6930/7930 Independent Study courses. 6 credits advanced math **Dissertation Research** 21 credits MAE 7970 **Dissertation Proposal & Final Defense** *No more than 21 credits of 5000- level coursework	**Coursework*:** 12 credits (minimum) Aerospace Core • must include MAE 5500 and 5560 if not previously completed 6 credits (minimum) Aerospace Electives/Other • No more than 6 credits MAE 7930 Doctoral Publications • No more than 6 credit MAE 5930/6930/7930 Independent Study courses. 3 credits advanced math **Dissertation Research** 21 credits MAE 7970 **Dissertation Proposal & Final Defense** *No more than 15 credits of 5000- level coursework

Purpose of the Degree
The new degree program will attract new PhD students to the MAE graduate studies and research program and provide graduate students with the opportunity to receive a degree more directly aligned with the academic and research skills that are critical to the aerospace industry. Students completing this degree program will possess skills sought by research organizations in industry, government, and academia requiring advanced design, research, and technical management in aerospace engineering. The PhD in Aerospace Engineering will support the Utah-based aerospace industry, as well as other prominent regional and national aerospace companies and research laboratories.

Institutional Readiness
The new degree program will be administered by the MAE Department, which has in place the administrative infrastructure necessary to manage the program. There is a graduate committee that oversees the graduate programs and a full-time staff member assigned to the graduate program. Presently, the MAE department supports a PhD program in Mechanical Engineering. The PhD program in Aerospace Engineering will place more emphasis on core aerospace engineering coursework, but will not require additional institutional resources or the development of new courses. In a very real sense, the level of effort and cost to administer this degree program will be the same as that already being accomplished for the Mechanical Engineering PhD degree.

Faculty
Eight faculty members in MAE have appropriate backgrounds and research interests in aerospace engineering to support the program. In the past, these faculty members have supported the MS program in Aerospace Engineering and a degree specialization in aerospace under the MS program in mechanical engineering.

Professors:
Christine Hailey - PhD Mechanical Engineering, University of Oklahoma, 1985 (aerodynamics and flight mechanics)

Associate Professors:
Rees Fullmer – PhD Mechanics Engineering, University of Utah, 1985 (guidance, navigation and control)
Steven Folkman - PhD Mechanical Engineering, Utah State University, 1990 (aerospace structures)
David Geller - PhD Space Physics and Astronomy, Rice University, 1999 (guidance, navigation and control)
Steven Whitmore - PhD Aerospace Engineering, University of California, Los Angeles, 1989 (flight mechanics and propulsion)

Assistant Professors:
Aaron Katz - PhD Aeronautics and Astronautics, Stanford University, 2009 (computational fluid dynamics)
Currently two additional faculty positions are being filled at the assistant professor level to support the needs of the Aerospace Engineering curriculum.

Staff
Additional staff lines will not be required. The current resources within the Department of Mechanical and Aerospace Engineering will be able to accommodate this new program.

Library and Information Resources
Two major library resources needed for the new program are the IEEE Xplore database and a series of journals produced by the American Institute of Aeronautics and Astronautics. The Merrill-Cazier library presently subscribes to these resources. See attached letter from the Merrill-Cazier Library.

Admission Requirements
Applicants with a bachelor's or master's degree in Aerospace Engineering or Mechanical Engineering from an ABET-accredited program can apply. For unrestricted admission to the program, students are required to have a minimum 3.3

GPA and successfully pass the GRE exam. The subject GRE is not required. Additional coursework in aerospace engineering fundamentals may be required in individual cases. All graduate students are expected to have a working knowledge of a computer programming language.

Student Advisement
The mechanics of admission to the programs and fulfilling program requirements are handled by our full-time staff graduate advisor. As students are admitted to the program, they are assigned a temporary faculty advisor who guides them on which courses to take the first semester and how to prepare for the PhD Qualification Exams. During the first semester, students select a graduate committee and a major professor who advise them throughout the rest of their program.

Justification for the Number of Credits
The number of credits required for this program is the same as the currently offered PhD in Mechanical Engineering which is overseen by the Graduate School.

External Review and Accreditation
As with the current PhD program in Mechanical Engineering and practice throughout the United States, no accreditation will be sought.

Projected Enrollment

Table 1. Projected enrollment for the PhD Aerospace Engineering Degree.

Year	Student FTE	Student Headcount	# of Faculty	Mean FTE-to-Faculty Ratio
1	4	4	8	0.50
4	6	6	8	0.75
3	8	8	8	1.00
4	9	9	8	1.13
5	10	10	8	1.25

Section III: Need

Program Need
Within the intermountain region, only Arizona State University, University of Arizona, and the University of Colorado at Boulder offer PhD programs in Aerospace Engineering. There are no Aerospace Engineering PhD degree programs in Wyoming, Nevada or Idaho, or within the Utah System of Higher Education (USHE). Thus, offering the Aerospace PhD degree better positions USU to capture regional talent that would otherwise leave the state. A flourishing PhD program in aerospace engineering will likely attract students who would not have previously considered USU.

Labor Market Demand
Nearly 80,000 engineers are currently employed in aerospace, significantly higher than the number employed in computer hardware, nuclear engineering, biomedical engineering or chemical engineering, among other fields. (IEEE, http://www.todaysengineer.org/2012/may/career-focus.asp) According to the U.S. Department of Labor, Bureau of Labor Statistics, aerospace engineers are expected to have a 7% growth in employment during the decade of 2012 to 2022.

Overall, Utah is one of the top ten states in the nation in the concentration of aerospace employment. In 2011, the Economic Development Corporation of Utah listed the leading aerospace organizations in Northern Utah. Largest amongst these organizations is Hill Air Force Base (HAFB) located just south of the city of Ogden, and near the towns of Clearfield, Riverdale, Roy, Sunset, and Layton. HAFB is the host unit for the USAF Material Command's 75th Air Base Wing. This unit provides

support for the Ogden Air Logistics Complex (OALC) and its subordinate organizations. The OALC is the worldwide manager for a wide range of aircraft, engines, missiles, software, avionics, and accessories components. The largest private employer is Alliant Technology Systems (ATK) with the Space Systems Division groups located in Magna and Promontory, and it's Aerospace Structures Division in Clearfield.
These large-scale employers are supported by a significant group of medium-sized employers including Aircraft and Space Defense Groups of Moog Inc., the Parker-Hannifin Corporation, Boeing Utah Company, and the Northrop Grumman Space and Missile Systems Group, all of Layton, Utah.

The Space Dynamics Laboratory, North Logan, Utah is a University Affiliated Research and Development Center (UARC) and a sub-unit of the Utah State University Research Foundation (USURF). It is a medium-sized non-commercial employer of aerospace engineers. SDL expects to continue to hire new PhD aerospace engineers as they have done for the past 50 years, and it would be to SDL's advantage if these PhD engineers were "home-grown" right in their own backyard.

Multiple small private supplier and integration organizations provide to this network of large-to medium scale employers. Examples of these small support vendors include Compositex, Inc., Sandy, Utah, a manufacturer of rocketry cases and nozzles; Groen Brothers Aviation Global, Inc., Salt lake City, Utah, a designer of high-performance rotorcraft for both civil and military applications; Borsight, Inc., Ogden, Utah, an aerospace systems integrator; and Hypercomp, Inc., Brigham City, Utah, a manufacturer of composite pressure vessels.

Despite the changing environment of the aerospace industry, where NASA's operations have scaled back significantly, demand for aerospace engineers by private, commercial, and national defense employers is still strong. Over the decade from 2012 to 2022, the Bureau of Labor Statistics projects a 7% growth in employment for aerospace engineers. This growth is primarily driven by two emerging markets 1) unmanned aerial vehicle (UAV) and their integration into civil airspace, and 2) commercial space ventures both crewed and robotic. These emerging markets will require the creation and development of a wide swath of highly specialized technologies in order to become viable, and will clearly support a large pool of employees with advanced aerospace engineering degrees. Given the large concentration of aerospace industries in Utah, USU graduates with a PhD in aerospace engineering will clearly be "first in line" to fill these high-paying positions; keeping "home-grown" talent "close to home." USU and SDL already host the annual "SmallSAT" international conference on small spacecraft technologies; and the introduction of the PhD degree in Aerospace Engineering will better position Utah State to become the de facto leader of small spacecraft world.

Student Demand
Presently the MAE department supports a PhD in Mechanical Engineering. A new PhD in Aerospace Engineering will provide graduate students with an option that is more focused on the specialized topics that are central to aerospace engineering. Graduates with a PhD in aerospace engineering will be better prepared and more competitive in the aerospace industry. Students wanting a PhD degree in aerospace engineering will be able to stay in Utah rather than go out of state. As stated previously, this change will help to keep home-grown talent close to home.

When the PhD in Aerospace Engineering program is approved, there exists a potential for an initial small decrease in the number of students pursuing a PhD in Mechanical Engineering. However, because of the previously-described market demand and the desire of many students to choose a program with a PhD in Aerospace Engineering, overall enrollment is in MAE's PhD programs is projected to increase during the next five years.

Section IV: Impact and Benefits

Collaborations with and Impact on Other USHE Institutions
There will be no impact on other USHE institutions.

Benefits
The PhD in Aerospace Engineering will directly impact the goals of the USHE to prepare a workforce and develop advanced aerospace technologies that will directly impact Utah's economy. This proposed degree will make USU graduates more competitive for aerospace engineering positions within Utah as well as elsewhere in the aerospace industry. By having more engineers educated and trained for their needs, the Utah aerospace companies are, presumably, going to be more competitive in competing for new contracts and developing new aerospace technologies.

Consistency with Institutional Mission
The mission of USU is to be one of the nation's premier student-centered land-grant and space-grant universities by fostering the principle that academics come first, by cultivating diversity of thought and culture, and by serving the public through learning, discovery, and engagement.

The proposed PhD in Aerospace Engineering enhances the University's reputation as a space-grant institution through both its graduates and research productivity. It supports the University Mission Statement in the following ways:

1. The department becomes more student-centered by providing a program to meet the needs of the students.
2. The doctoral program will improve academics in aerospace engineering by fostering research in the forefront of the field, consistent with the USU mission to be one of the nation's premier space-grant universities.

The doctoral program will serve the public by application of the research produced. It will also serve the growing aerospace industry in Utah with a better-prepared work force.

Section V: Program and Student Assessment

Program Assessment
The major goal for the program is to graduate PhD students with expertise in aerospace engineering and who are prepared to meet the needs of research organizations in industry and academia. Attainment of this goal will be measured by the placement rate of graduates within local and national research laboratories in industry, government, and academia.

Expected Standards of Performance
The standard of performance for all students is a grade of C or better in all classes required for the degree and to maintain an overall program GPA of 3.0 or higher in order to graduate with a PhD degree. In addition, all PhD students must satisfactorily pass a set of qualification exams within 3 semesters of being admitted to the aerospace engineering PhD program, and pass a dissertation defense upon completion of their dissertation research. PhD students are also expected to publish in peer-reviewed journals before completing their PhD program of study. These standards are already well established in the Graduate School as well as for the existing Mechanical Engineering PhD degree program.

Section VI: Finances

Funding Sources
The proposed PhD in Aerospace Engineering builds on MAE's MS in Aerospace Engineering Program and the aerospace specialization in place within MAE's undergraduate program. Additional funding is not required.

Reallocation
No budget transfers or reallocations will be requested or needed to offer a quality program as explained in the next section.

Impact on Existing Budget
A new aerospace PhD degree will enhance the MAE graduate program with virtually no impact on existing budgets.

Faculty: This new degree will have no impact on faculty salaries since new faculty positions are not needed to offer the degree. In reality, each professor is constantly managing his/her time to maintain a research program that includes preparing proposals, contract management, student mentoring, teaching courses, publishing research results, and providing University and professional service. Experience has shown that even though the required student contact time increases with the number of graduate advisees, the overall workload may not increase but actually decrease because there is more graduate student support for developing and maintaining the research productivity. The MAE Faculty feels that the benefits of the projected enrollment offset the time costs to manage the program.

Staff: This new degree program will have no impact on staff work load and staff salaries.

Facilities: During the past five years, the MAE department has been planning for and working toward increased graduate enrollment and has sufficient office/study space to accommodate the expected small enrollment increase. Most of the incidental cost associated with graduate students is already covered by the research grants/contracts and F&A return such that the impact on E&G funds is essentially zero.

Operating Costs: Increase in enrollment results in increased copy service charges and other miscellaneous expenses. MAE has already been using electronic communications more and more to curb paper and copy expenses. This will continue such that these costs will be minimal for this degree program. In summary, the additional work load imposed by this degree is minimal and will have no impact on tasks that would normally be done by current faculty and staff.

Budget Explanation: Salaries, wages, and benefits represent the expenses associated with teaching the courses for the new PhD Aerospace program. Since these courses are already being taught, the revenue to pay for these expenses is simply a reallocation within current department funds. Thus, the difference, revenue less expenses, is zero. The teaching expenses are based on eight faculty members with an approximately 50% teaching role assignment, and with a 50/50 split between mechanical engineering courses and aerospace engineering courses. The expenses are thus approximately 25% of our current salaries, wages, and benefits for these faculty members. Note that any additional expenses associated with research will be externally funded.

Comments for Table 2:

- FTE = 10 credits
- Tuition increase is estimated at 8%.
- Salary and Wages increase is estimated at 3%.
- Benefit increase follows the Sponsored Programs rates
- No new funding is required for this program.

Table 2. Projected Aerospace PhD Program Revenue and Expenses

		Year 1	Year 2	Year 3	Year 4	Year 5
Students						
	Projected FTE	4	6	8	9	10
	Cost Per FTE	12,173	10,843	9,811	9,455	9,139
	Student/Faculty Ratio	0.50	0.75	1.00	1.13	1.25
Projected Tuition						
	Gross Tuition	21,897	35,473	51,081	62,063	74,476
	Tuition to Program	0	0	0	0	0
5 Year Budget Projection						

		Year 1	Year 2	Year 3	Year 4	Year 5
Expenses						
	Salaries & Wages					
	Benefits	N/A – All costs are currently covered in existing programs. There are no additional faculty or staff FTE, library or other operational funds required				
	Total Personnel					
	Current Expense					
	Travel					
	Capital					
	Library Expense					
Total Expense						
Revenue						
	Legislative Appropriation					
	Grants	N/A – Funded through existing resources				
	Reallocation					
	Tuition to Program					
	Fees					
Total Revenue						
Difference	Revenue-Expense	0	0	0	0	0

Appendix A: Program Curriculum

All Program Courses

PhD Beyond BS	
Course Requirements	**Credit Hours (minimum)**
Core Courses	24
Math Courses	6
Dissertation Research	21
Technical electives/other credits	21
Total Credits	72

PhD Beyond MS	
Course Requirements	**Credit Hours (minimum)**
Core Courses	12
Math Course	3
Dissertation Research	21
Technical electives/other credits	6
Total Credits	42

Existing Aerospace Core Courses

Fall Semester

MAE 5500 Aerodynamics
MAE 5560 Dynamics of Space Flight
MAE 6500 Potential Flow
MAE 6510 Aircraft Dynamics and Flight Simulation
MAE 6540 Advanced Astrodynamics
MAE 7540 Advanced Astrodynamics Techniques/Applications

Spring Semester

MAE 6340 Spacecraft Attitude Control
MAE 6560 Spacecraft Navigation
MAE 6930 Advanced Control of Aero Vehicles

Summer Semester

MAE 6530 Advanced Propulsion
MAE 6570 Optimal Space Guidance
MAE 6930 Monte Carlo and Linear Covariance Techniques
MAE 7560 Optimal Estimation/Aerospace

Aerospace Technical Electives

Fall Semester

MAE 5310 Dynamic Systems and Controls
MAE 5420 Compressible Fluid Flow
MAE 6180 Dynamics & Vibrations
MAE 6410 Fluid Dynamics
MAE 7360 Optimal and Robust Control

MAE 6320 Linear Multivariable Control
ECE 5230 Space Systems Engineering
ECE 6240 Space Environment Engineering
ECE 6650 Optics I

Spring Semester

MAE 5440 Computational Fluid Dynamics
MAE 5510 Dynamics of Atmospheric Flight
MAE 5540 Propulsion Systems
MAE 6440 Advanced Computational Fluid Dynamics
MAE 6490 Turbulence*
MAE 6550 Advanced Structural Analysis
MAE 7330 Nonlinear and Adaptive Control
MAE 7350 Intelligent Control Systems

All Semesters (Fall, Spring, and Summer)

MAE 5930, 6930, 7930 Special Topics (must be Aero focused)

Approved Mathematics Courses

a. MATH 5270: Complex Variables
b. MATH 5410: Methods of Applied Mathematics
c. MATH 5420: Partial Differential Equations
d. MATH 5460: Introduction to Theory and Application of Nonlinear Dynamics Systems
e. MATH 5760: Stochastic Processes
f. MATH 6270: Complex Variables
g. MATH 6410: Ordinary Differential Equations I
h. MATH 6420: Partial Differential Equations I
i. MATH 6440: Ordinary Differential Equations II
j. MATH 6450: Partial Differential Equations II
k. MATH 6470: Advanced Asymptotic Methods
l. MATH 6610: Numerical Analysis
m. MATH 6620: Numerical Analysis
n. MATH 6640: Optimization
o. ECE 6010: Stochastic Processes in Electronic Systems
p. ECE 6030: Mathematical Methods for Signals and Systems
q. STAT 5200 Design of Experiments
r. MAE 7560 Optimal Estimation for Aerospace Systems

New Courses to be Added in the Next Five Years

No new courses are currently planned. However, to enhance the program and continually strengthen its relevance, it is expected that new courses will be integrated over time into the program using well established practices.

Appendix B: Program Schedule

The following is a sample program of study for the Aerospace Engineering PhD beyond the BS.

PhD Aerospace Engineering (Year 1)			Yr 1 Credits
Fall 1	**Spring 1**	**Summer 1**	
MAE 5500	MAE 6340	MAE 6530	
MAE 5560	MAE 5540[1]		
MAE 5420[1]	MAE 5440[1]		
9 hours	9 hours	3	21

[1] Technical Elective

PhD Aerospace Engineering (Year 2)			Yr 2 Credits
Fall 2	**Spring 2**	**Summer 2**	
MAE 6500	MAE 6560	MAE 6570	
MAE 6540	Math 5420		
MAE 5310[1]	MAE 6440[1]		
9 hours	9 hours	3 hours	21

[1] Technical Elective

PhD Aerospace Engineering (Year 3)			Yr 3 Credits
Fall 3	**Spring 3**	**Summer 3**	
MAE 6410[1]	MAE 7970	MAE 7560[m]	
ECE 5230[1]			
6 hours	9 hours	3 hours	18

[1] Technical Elective [m] Math Course

PhD Aerospace Engineering (Year 4)			Yr 4 Credits
Fall 4	**Spring 4**	**Summer 4**	
MAE 7970	MAE 7970		
6 hours	6 hours		12

Total Credits	72

The following is a sample program of study for the Aerospace Engineering PhD beyond the MS.

PhD Aerospace Engineering (Year 1)			Yr 1 Credits
Fall 1	**Spring 1**	**Summer 1**	
MAE 5500	MAE 6340	MAE 6530	
MAE 5560	MAE 5540[1]		
MAE 5420[1]	MATH 5420		
9 hours	9 hours	3	21

[1] Technical Elective

PhD Aerospace Engineering (Year 2)			Yr 2 Credits
Fall 2	**Spring 2**	**Summer 2**	
MAE 7970	MAE 7970		
6 hours	6 hours		12

[1] Technical Elective

PhD Aerospace Engineering (Year 3)			Yr 3 Credits
Fall 3	**Spring 3**	**Summer 3**	
MAE 7970	MAE 7970		
6 hours	3 hours		9

Total Credits	42

Appendix C: Faculty

Professors:
Christine Hailey - PhD Mechanical Engineering, University of Oklahoma, 1985 (aerodynamics and flight mechanics)

Associate Professors:
Rees Fullmer – PhD Mechanics Engineering, University of Utah, 1985 (guidance, navigation and control)
Steven Folkman - PhD Mechanical Engineering, Utah State University, 1990 (aerospace structures)
David Geller - PhD Space Physics and Astronomy, Rice University, 1999 (guidance, navigation and control)
Steven Whitmore - PhD Aerospace Engineering, University of California, Los Angeles, 1989 (propulsion)

Assistant Professors:
Aaron Katz - PhD Aeronautics and Astronautics, Stanford University, 2009 (computational fluid dynamics)
Currently two additional faculty positions are being filled at the assistant professor level to support the needs of the Aerospace Engineering curriculum.